

SERIES: VRX3-DIP | DESCRIPTION: DC-DC CONVERTER
FEATURES

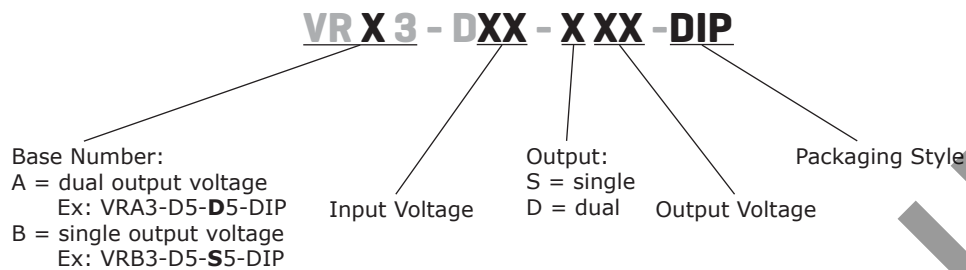
- 3 W isolated output
- wide input (2:1)
- industry standard 10 pin DIP package
- no heatsink required
- unregulated outputs
- 1,500 V isolation
- short circuit protection
- wide temperature (-40~85°C)
- efficiency up to 80%


MODEL

| MODEL | input voltage | | output voltage (Vdc) | output current | | output power max (W) | ripple and noise ¹ typ (mVp-p) | efficiency typ (%) |
|------------------|---------------|----------------|-------------------------|----------------|-------------|----------------------------|---|--------------------------|
| | typ (Vdc) | range (Vdc) | | min (mA) | max (mA) | | | |
| VRA3-D5-D5-DIP | 5 | 4.5~9.0 | ±5 | ±30 | ±200 | 3 | 50 | 68 |
| VRA3-D5-D9-DIP | 5 | 4.5~9.0 | ±9 | ±16 | ±167 | 3 | 50 | 70 |
| VRA3-D5-D12-DIP | 5 | 4.5~9.0 | ±12 | ±12 | ±125 | 3 | 50 | 72 |
| VRA3-D5-D15-DIP | 5 | 4.5~9.0 | ±15 | ±10 | ±100 | 3 | 50 | 73 |
| VRA3-D12-D5-DIP | 12 | 9.0~18.0 | ±5 | ±30 | ±200 | 3 | 50 | 74 |
| VRA3-D12-D9-DIP | 12 | 9.0~18.0 | ±9 | ±16 | ±167 | 3 | 50 | 76 |
| VRA3-D12-D12-DIP | 12 | 9.0~18.0 | ±12 | ±12 | ±125 | 3 | 50 | 78 |
| VRA3-D12-D15-DIP | 12 | 9.0~18.0 | ±15 | ±10 | ±100 | 3 | 50 | 79 |
| VRA3-D24-D5-DIP | 24 | 18.0~36.0 | ±5 | ±30 | ±200 | 3 | 50 | 77 |
| VRA3-D24-D9-DIP | 24 | 18.0~36.0 | ±9 | ±16 | ±167 | 3 | 50 | 78 |
| VRA3-D24-D12-DIP | 24 | 18.0~36.0 | ±12 | ±12 | ±125 | 3 | 50 | 79 |
| VRA3-D24-D15-DIP | 24 | 18.0~36.0 | ±15 | ±10 | ±100 | 3 | 50 | 80 |
| VRA3-D48-D5-DIP | 48 | 36.0~72.0 | ±5 | ±30 | ±200 | 3 | 50 | 77 |
| VRA3-D48-D9-DIP | 48 | 36.0~72.0 | ±9 | ±16 | ±167 | 3 | 50 | 78 |
| VRA3-D48-D12-DIP | 48 | 36.0~72.0 | ±12 | ±12 | ±125 | 3 | 50 | 79 |
| VRA3-D48-D15-DIP | 48 | 36.0~72.0 | ±15 | ±10 | ±100 | 3 | 50 | 80 |
| VRB3-D5-S5-DIP | 5 | 4.5~9.0 | 5 | 60 | 600 | 3 | 50 | 68 |
| VRB3-D5-S9-DIP | 5 | 4.5~9.0 | 9 | 33 | 333 | 3 | 50 | 70 |
| VRB3-D5-S12-DIP | 5 | 4.5~9.0 | 12 | 25 | 250 | 3 | 50 | 72 |
| VRB3-D5-S15-DIP | 5 | 4.5~9.0 | 15 | 20 | 200 | 3 | 50 | 73 |
| VRB3-D12-S5-DIP | 12 | 9.0~18.0 | 5 | 60 | 600 | 3 | 50 | 74 |
| VRB3-D12-S9-DIP | 12 | 9.0~18.0 | 9 | 33 | 333 | 3 | 50 | 76 |
| VRB3-D12-S12-DIP | 12 | 9.0~18.0 | 12 | 25 | 250 | 3 | 50 | 78 |
| VRB3-D12-S15-DIP | 12 | 9.0~18.0 | 15 | 20 | 200 | 3 | 50 | 77 |
| VRB3-D24-S5-DIP | 24 | 18.0~36.0 | 5 | 60 | 600 | 3 | 50 | 77 |
| VRB3-D24-S9-DIP | 24 | 18.0~36.0 | 9 | 33 | 333 | 3 | 50 | 78 |
| VRB3-D24-S12-DIP | 24 | 18.0~36.0 | 12 | 25 | 250 | 3 | 50 | 79 |
| VRB3-D24-S15-DIP | 24 | 18.0~36.0 | 15 | 20 | 200 | 3 | 50 | 80 |
| VRB3-D48-S5-DIP | 48 | 36.0~72.0 | 5 | 60 | 600 | 3 | 50 | 77 |
| VRB3-D48-S9-DIP | 48 | 36.0~72.0 | 9 | 33 | 333 | 3 | 50 | 78 |
| VRB3-D48-S12-DIP | 48 | 36.0~72.0 | 12 | 25 | 250 | 3 | 50 | 79 |
| VRB3-D48-S15-DIP | 48 | 36.0~72.0 | 15 | 20 | 200 | 3 | 50 | 80 |

Notes: 1. ripple and noise are measured at 20 MHz BW

PART NUMBER KEY



INPUT

| parameter | conditions/description | min | typ | max | units |
|-------------------------|------------------------|------|-----|------|-------|
| operating input voltage | 5 V model | 4.5 | 5 | 9.0 | Vdc |
| | 12 V model | 9.0 | 12 | 18.0 | Vdc |
| | 24 V model | 18.0 | 24 | 36.0 | Vdc |
| | 48 V model | 36.0 | 48 | 72.0 | Vdc |

OUTPUT

| parameter | conditions/description | min | typ | max | units |
|-------------------------|-------------------------------------|-------------|-------|-------|-------|
| line regulation | input voltage from low to high | | ±0.2 | ±0.5 | % |
| load regulation | measured from 10% load to full load | VRA3 models | ±0.5 | ±1.0 | % |
| | | VRB3 models | ±0.5 | ±0.75 | % |
| voltage accuracy | positive | | ±1 | ±3 | % |
| | negative | | ±3 | ±5 | % |
| ripple and noise | 20 MHz bandwidth | | 50 | 100 | mVp-p |
| switching frequency | 100% load, input voltage range | | 300 | | kHz |
| temperature coefficient | | | ±0.03 | | %/°C |

PROTECTIONS

| parameter | conditions/description | min | typ | max | units |
|--------------------------|------------------------|-----|-----|-----|-------|
| short circuit protection | continuous | | | | |

SAFETY AND COMPLIANCE

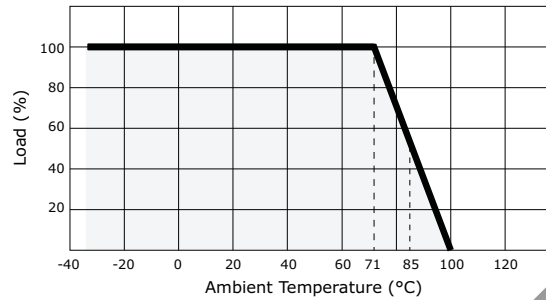
| parameter | conditions/description | min | typ | max | units |
|-----------------------|----------------------------------|-----------|-----|-----|-------|
| isolation voltage | for 1 minute at 1 mA max. | 1,500 | | | Vdc |
| isolation resistance | at 500 Vdc | 1,000 | | | MΩ |
| isolation capacitance | input to output at 100 kHz / 1 V | | 85 | | pF |
| MTBF | | 1,000,000 | | | hours |
| RoHS compliant | yes | | | | |

ENVIRONMENTAL

| parameter | conditions/description | min | typ | max | units |
|-----------------------|---------------------------------|-----|-----|-----|-------|
| operating temperature | | -40 | | 85 | °C |
| storage temperature | | -55 | | 125 | °C |
| storage humidity | non-condensing | | | 95 | % |
| temperature rise | at full load | | 15 | | °C |
| lead temperature | 1.5 mm from case for 10 seconds | | | 300 | °C |

DERATING CURVES

1. output power vs. ambient temperature

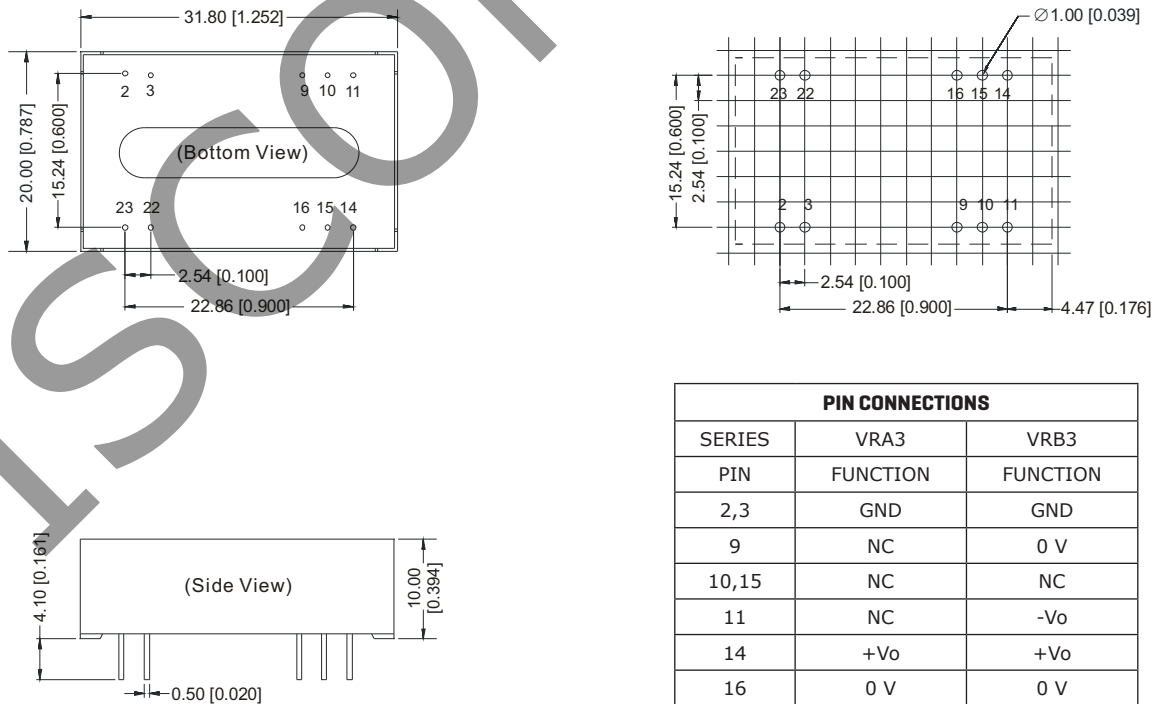


MECHANICAL

| parameter | conditions/description | min | typ | max | units |
|---------------|--|-----|-----|-----|-------|
| dimensions | 1.252 x 0.787 x 0.394 (31.80 x 20.00 x 10.00 mm) | | | | inch |
| case material | stainless steel | | | | |
| weight | | | 14 | | g |

MECHANICAL DRAWING

units: mm [inches]
 tolerance: ± 0.25 [± 0.010]
 pin section tolerance: ± 0.10 mm [± 0.004]



| PIN CONNECTIONS | | |
|-----------------|----------|----------|
| SERIES | VRA3 | VRB3 |
| PIN | FUNCTION | FUNCTION |
| 2,3 | GND | GND |
| 9 | NC | 0 V |
| 10,15 | NC | NC |
| 11 | NC | -Vo |
| 14 | +Vo | +Vo |
| 16 | 0 V | 0 V |
| 22,23 | +Vin | +Vin |

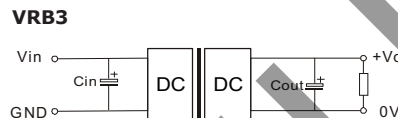
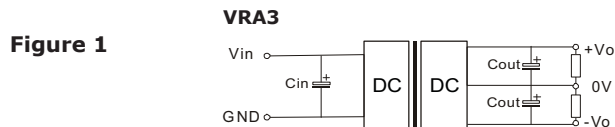
APPLICATION NOTES

1. Requirement on Output Load

In order to ensure the product operates efficiently and reliably, make sure the specified range of input voltage is not exceeded and the minimum output load is not less than 10% load. If the actual load is less than the specified minimum load, the output ripple may increase sharply while its efficiency and reliability will reduce greatly. If the actual output power is very small, please add an appropriate resistor as extra loading.

2. Recommended Circuit

All VRX3 converters have been tested according to the following recommended testing circuit before leaving the factory. This series should be tested under load, never under no load (Figure 1).



However, the capacitance of the output filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the greatest capacitance of its filter capacitor see (Table 1).

General:

| | | |
|------|---------------------|--------------------------------|
| Cin | 5, 12 V 24, 48 V | 100 μ F 10 ~ 22 μ F |
| Cout | 10 μ F / 100 mA | |

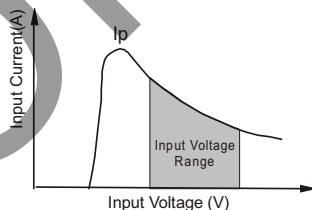
Table 1

| VRA3 Vout (Vdc) | Cout (μ F) | VRB3 Vout (Vdc) | Cout (μ F) |
|-----------------|-----------------|-----------------|-----------------|
| ± 5 | 680 | 5 | 1,000 |
| ± 9 | 470 | 9 | 680 |
| ± 12 | 330 | 12 | 470 |
| ± 15 | 220 | 15 | 330 |

3. Input Current

While using unstable power source, please ensure the output voltage and ripple voltage do not exceed indexes of the converter. The preceding power source must be able to provide for converter sufficient starting current I_p .

General: $I_p \leq 1.4 * I_{in-max}$



4. No parallel connection or plug and play

REVISION HISTORY

| rev. | description | date |
|------|-----------------------------|------------|
| 1.0 | initial release | 05/09/2012 |
| 1.01 | V-Infinity branding removed | 09/11/2012 |

The revision history provided is for informational purposes only and is believed to be accurate.



Headquarters
20050 SW 112th Ave.
Tualatin, OR 97062
800.275.4899

Fax 503.612.2383
cui.com
techsupport@cui.com

CUI offers a two (2) year limited warranty. Complete warranty information is listed on our website.

CUI reserves the right to make changes to the product at any time without notice. Information provided by CUI is believed to be accurate and reliable. However, no responsibility is assumed by CUI for its use, nor for any infringements of patents or other rights of third parties which may result from its use.

CUI products are not authorized or warranted for use as critical components in equipment that requires an extremely high level of reliability. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.